

## **DETERMINANTS OF PRIVATE INVESTMENTS IN SOUTH AFRICA**

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by

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## **ABSTRACT**

This paper reviews the causal connection between private investment; interest rates and macroeconomic uncertainty in South Africa on a yearly time series data range between 1980 and 2014.

This research was encouraged by the continually weakening private investment in South Africa relative to total investment. There is a need to turn around this pattern. This research contributes towards a greater comprehension of the variables and their direction of impact in the examination of the pattern of private investments and additionally, the impacts of interest rate and macroeconomic uncertainty on private investment in SA. The study employs an ARDL model for co-integration to explore the presence of a long-run relationship between the variables and the granger causality within VECM to check the interrelations among the series. The findings reveal that all variables are co-integrated to suggest the existence of a long-run relationship among private investment, long-term interest rates and bond spread. The results show that macroeconomic uncertainty exerts an adverse influence on private investment, in accordance with economic theory. In contrast to the theory, the long-term interest rates coefficient is positive and significant in the projected equation. Therefore, the conclusion is that the interest rate contributes toward the reduction in private investment. Keeping in mind the end goal to resuscitate private investment, government ought to consider receiving approaches that lift total request, offering greater venture motivations, facilitating credit limitations by forming a more productive and vigorous money-related framework, decreasing macroeconomic vulnerabilities, encouraging foundation improvement, and empowering inflows of outside speculation.

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## **GLOSSARY OF TERMS**

BS	Bond Spread
DTI	Department of Trade and Industry
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEAR	Growth Employment and Redistribution
MCEP	Manufacturing Competitiveness Enhancement Programme
NDP	National Development Plan
PRI	Private Investment
PU	Public Investment
SA	South Africa
SADUMM	South African Dummy Variable



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## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the Study**

It is broadly acknowledged that private investment is critical within the accomplishment of financial and political goals (Sarkar, 2012; Gittell & Kaen, 2003). To emphasise its economic importance, investment is part of the four key pillars – together with government spending, non-public utilisation as well as global exchange – of the total macroeconomic consumption version of the advanced economic estimation (Parkin et al., 2010:47). Consistent with Salahuddin and Islam (2008), investment is core to an economic estimation, and changes in investment considerably affect financial action and long-term monetary development. The vital function of investment was supported via Stampini et al. (2013), who observed an optimistic relationship between private investment and economic growth. To understand the significance of private investment inside the economic estimation, authorities around the globe have launched endeavours that draw in private investment, utilising different impetus arrangements; for example, impose rate diminishments, speculation stipends and endowments (Sarkar, 2012) and reduced interest rates (Fukuda, 2011), amongst others.

South Africa, like other emerging economies, has recognised the position of private investment in enhancing boom prospects of the economy. This recognition is underlined by the National Development Plan (NDP), which tries to support private investment as a major aspect of basic activities to be undertaken to accomplish the 5.4% national target growth plans of annual financial development through to 2030 (National Plan Commission et al., 2011). The significance of private investment is emphasised because of South Africa's huge money-related deficit.

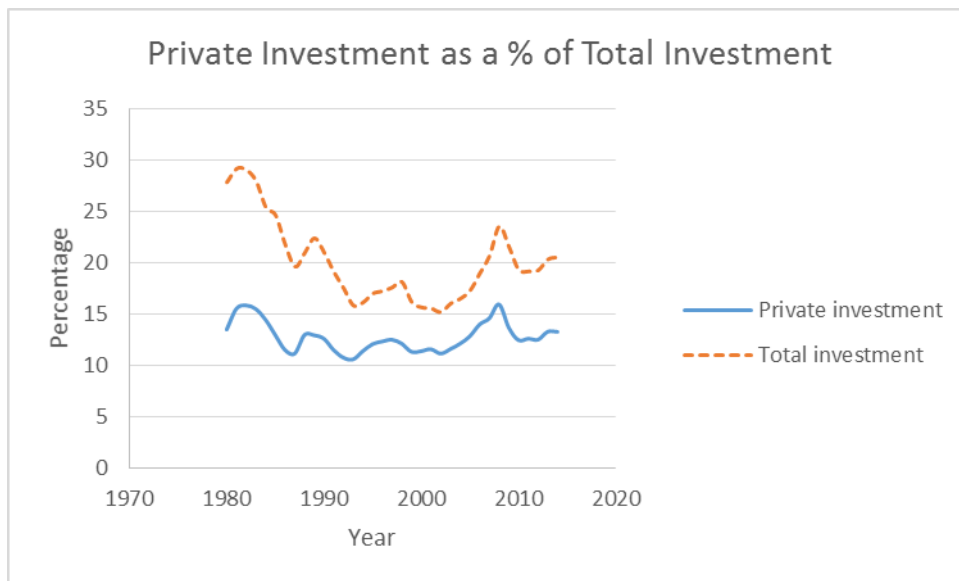
#### **1.2 Problem Statement**

South Africa's total investment as a percentage of GDP vacillated from a low of 12% in the mid- to late 1990s to the present level of 20%. Overall, investment had expanded in the 1960s, cresting in 1975 – a length of excessive boom in SA; and began weakening from 1976 because of heightening politically motivated seclusion, following the Soweto Uprising and disinvestment by international companies on account of the hostile to politically-sanctioned racial segregation developments (Weinstein, Alam, & Blose, 1991). Separating overall

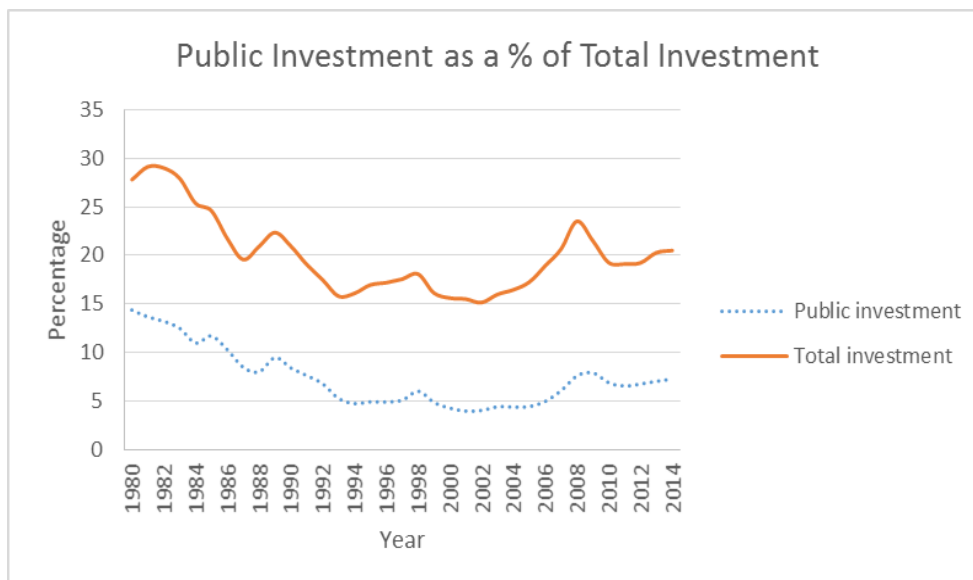
investment into its integral components, Stampini et al. (2013) discovered that SA's private investment represented an average of 71% of total investment during the period 2003 and 2008, whereas public investment represented the remainder. As indicated by the most recent accessible information from the SA Reserve Bank, private investment currently represents 63% of the whole investment. While private investment declined in the 1970s, in light of the already stated reasons (Weinstein et al., 1991), such investment also decreased as a result of rising costs of commodities (Fedderke & Luiz, 2008; Kumo, 2006; Rodrik, 1991). Privatisation endeavours by the National Party Government in the late 1980s basically exchanged country resources for the non-public area (Narsiah, 2002). For example, the Iron and Steel Corporation (Iskor, now ArcelorMittal SA) was sold in 1989 as well as National Sorghum in 1991 (Hentz, 2000). At some point during those years, private investment was in the form of acquisition of national resources through the national divestment programme. The 1996 Growth, Employment and Redistribution (GEAR) strategy of the African National Congress achieved coherence through their privatisation programme with that of the earlier authorities (Narsiah, 2002).

As opposed to private investment, public investment as a percentage of overall investment was on the decline ever since the 1960s, demonstrating a major slump post 1976. Public investment as a percentage of GDP balanced out at round 3% in view of the political changes in 1994, with only a marginal increase being measured because of the development projects of Eskom and Telkom to provide phone lines and electricity to regions that had previously been excluded by the National Party Government (Perkins et al., 2005) (see Figures 2.1 and 2.2). The recorded 3% is the perceived lowest global investment benchmark required for supported monetary development. Insufficient investment in infrastructure creates bottlenecks, and opportunities for advancing financial development can be missed (Perkins et al, 2005).

**Figure 2.1: Private Investment as a % of Total Investment**

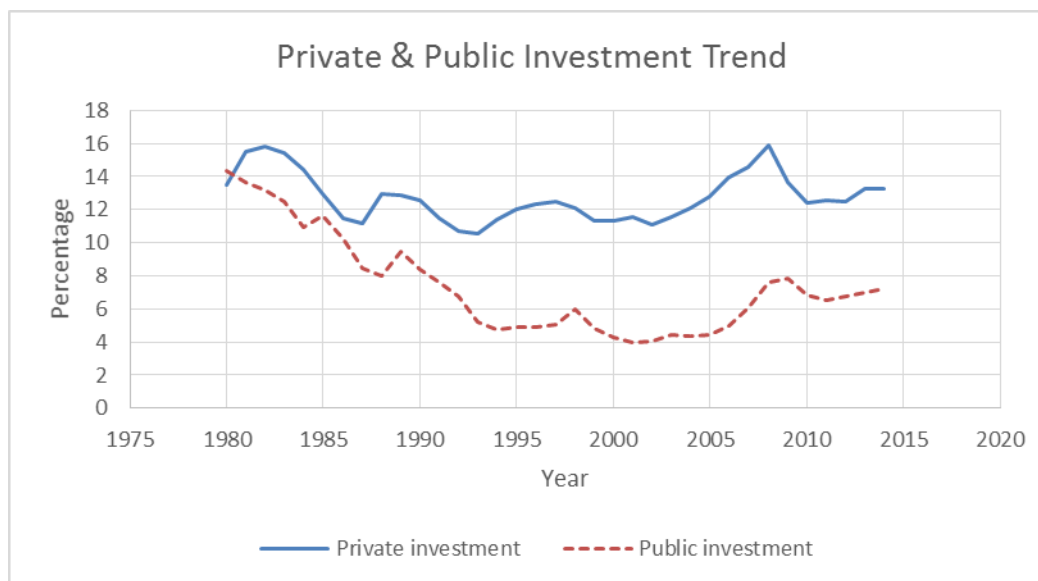


**Figure 2.2: Public Investment as a % of Total Investment**



At a disaggregated level, it is obvious that public investment became the promoter of expanding overall investment amid the development period of the 1960s and the mid-1970s, as confirmed by means of expanding public investment (see Figure 2.3). Since the mid-1970s, the extent of private investment versus public investment transformed and investment started on a disparate way.

**Figure 2.3 Private and public investment trend**



Source: SA Reserve Bank, October 2016

Toit and Moolman (2004) assessed SA's investment work by measuring domestic fixed investment, while Fielding (1999) concentrated on the version of investment at the sectoral stage, utilising total capital used within manufacturing sector. Their research saw little difference between the public and private parts of investment (Khan & Reinhart, 1990). There are two reasons why the particular approach is fundamental. To begin with, public investment is an element of its approach as opposed to a showcase of its powers. Government has control over public investment and in this manner, makes public investment a strategy variable (Greene & Villanueva, 1991), while the hypothesis and prevailing confirmation recommend private investment is impacted by various variables. For instance, using Aizenman and Marion's (1999) study on instability and its effect on investment, they discovered that once investment was made, the resultant outcomes were measurably noteworthy, even though there were vast differences when overall investment was broken down into private and public investments.

There are complicated linkages between private and public investments; for example, corresponding qualities of public-private investments, in which private investment is "crowded-in" by public investment in centre position (Erden & Holcombe, 2006). The crowding-in normal for public investment also indicates a conceivable presence of multicollinearity using amassed examinations, where complementarity exists, in this manner affecting the legitimacy of the outcomes and subsequent translation.

Due to obstacles experienced regarding cross-country studies and diverse attention of South African centred investigations, this study chose an in-depth investigation of private investment, utilising South Africa as a contextual analysis to construct a sound legal establishment for illuminating the strategy dilemma as to the actions that may be implemented to invigorate private investment (Jongwanich & Kohpaiboon, 2008).

The overall research question for this study is: “What are the trends of private investment in the South African economy”?

In addition to the above question, there are two particular questions that will assist estimate the trends of private investment in South Africa. Each research question is provided with corresponding null and alternative hypotheses.

#### 1.2.1 Research question 1

What type of effect does interest rate have on private investment?

In assessing the effect of interest rate on private investment, it is essential to comprehend that there are various types of interest rates, ranging from short-term rates through to medium- and long-term rates. Therefore, it is vital to utilise the correct rate for the concept of private investment in analysis. The investigation utilises the long-term bond rates (10-year government bond) to coordinate the long-term nature of private investment with accurate interest charges.

The null and alternative hypothesis is expressed as follows:

#### **Hypothesis 1**

Null hypothesis: The interest rate has no significant relationship with private investment.

Alternative hypothesis: The interest rate has a significant effect on private investment.

#### 1.2.2 Research question 2

Does macroeconomic uncertainty negatively affect private investment?

Uncertainty presents itself in an extensive variety of systems and the significance of every uncertainty degree shifts for various nations. South Africa is a vote-based nation with solid establishments for settling in vote-based standards; yet, it is still subjected to all types of uncertainty. There are distinctive markers that can be utilised to quantify uncertainty. For this investigation, the bond spread that is figured as the contrast between three-month treasury rate and 10-year government bond, was utilised as an intermediary for macroeconomic uncertainty.

The null and alternative hypothesis is expressed as follows:

## **Hypothesis 2**

Null hypothesis: Macroeconomic uncertainty is not related to private investment.

Alternative hypothesis: Macroeconomic uncertainty has a significant effect on private investment.

## **1.3 Significance of the Research**

The significance of the investigation is in its capability to provide some insight into the methods that can be used to enhance private investment. Employment creation is among the goals governments desire, and private investment has a critically integral part in creating employment.

Jongwanich (2007) discovered that private investment has the lowest speed of adjustment compared to other variables such as consumption, exports, imports and other macroeconomic variables. However, private investment is amongst the best drivers of employment creation (Stampin et al., 2013; Murty & Soumya, 2007). A blend of effective impact factors as well as ease-back response areas point to the requirement for a well-planned approach to advance private investment (Jongwanich & Kohpaiboon, 2008).

South Africa's financial market development has been subdued because of emphasis on socio-political factors. This study and its findings can create the political will and commitment to the components that can support private investment and monetary development. Over the last 10 years, SA experienced a 2% output gap with regard to the mean output of the BRICS nations. Thus, there may be an additional requirement to recognise elements as a way to reduce such output gap.

#### **1.4 Organisation of the Study**

The study comprises five chapters that broadly clarify particular subject areas. Chapter one provides the background of the topic, informs the research problem, provides research hypotheses and motivation for the study. Chapter two demonstrates a thorough survey of hypothesis and a literature review of the private investments determinants. Chapter three provides the research methodology. Chapter four presents the research outcomes and interpretation. The final chapter (Chapter five) provides the conclusions.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1. Introduction**

Investment is defined as the acquisition of gainful resources with a view to creating future income or wage (Truu, 1987:131). It consists of public and private ventures with the previous alluding to speculation by authorities, together with public-owned undertakings, while the latter alludes to ventures by private organisations with the end goal of benefit (Kumo, 2006). Procurement of pay-yielding paper resources like bank deposits, government securities and corporation stocks is seen as reserve funds (this is, a wellspring of investible finances) and not investment (Truu, 1987:131).

#### **2.2 Theoretical Framework**

Investment forms the basic part of any economy for many reasons, including the following (Akanbi, 2012; Du Toit & Moolman, 2004; Ghura & Goodwin, 2000):

- Investment builds a nation's productive capacity and establishes the framework for expanded future wages, if speculation costs are on solid products with moderately long life expectancies and those that epitomise the latest niche innovations;
- Second, investment expenditure prompts an increase in the total levels of employment and individual pay by influencing the interest for capital merchandise (Anyanwu, 2006);
- Third, investment plays an important role, and is a fickle factor of the GDP, and in turn supports investment in a symbiotic-styled cycle.

The study indicated distinctive versions of investment, with each version taking an alternative point of view of private investment. The core literature on investment theories is reviewed below.

##### **2.2.1 Keynesian model**

As per this model, investment relies upon the planned minor proficiency of resources in respect to some interest rates mirroring the cost in terms of foregoing alternatives of contributed reserves (Serven & Solimano, 1992). Appropriately, greater investment will be acknowledged so long as the minimal productivity of contributed wealth is more noteworthy

than the cost in terms of foregoing alternatives of contributed reserves. This version is connected to the complementarity hypothesis of public investment, which contends that such public investment in main infrastructure helps boost efficiency of private investment (Erden & Holcombe, 2006).

### **2.2.2 Accelerator model**

The accelerator model is based on the supposition of a settled money towards yield proportion, suggesting that costs, compensation, duties and loan fees compel no immediate effect on wealth outlay; however, they will have roundabout [indirect] effects (Toit & Moolman, 2004). In this way, the version makes investment a straight extension of variations in yield. One of the limitations of this version is that investment force may be changed depending on the comparative costs of different production elements (Serven & Solimano, 1992).

### **2.2.3 McKinnon and Shaw model**

The McKinnon and Shaw model is based on the studies by McKinnon (1973) and Shaw (1973), who emphasised the correlative concept of reserve funds and investment. As indicated by this version, an ascent in loan fee builds capacity of reserve funds via intermediaries and this way increases investment funds. The investment increases on account of more prominent accessibility of investible subsidies in a process referred to as ‘conduit effect’ (Odhiambo, 2005).

### **2.2.4 Neoclassical investment theory**

The limitations of the accelerator model prompted the development of the neoclassical technique. It highlights that it depends on an unequivocal developmental conduct of firms, needing capital stock to achieve interest rate, yield, capital costs and assessment approaches. In this technique, the coveted capital stock relies upon the cost of capital, which thus relies upon the cost of capital merchandise, genuine loan fee and devaluation fees (Serven & Solimano, 1992).

### **2.2.5 Tobin's q-model**

As indicated by the Tobin's q-model, net investment depends on the ratio of the market value of business capital assets to their replacement value – a proportion referred to as Tobin's q (Toit & Moolman, 2004). In accordance with this version, a higher market value relative to replacement costs could motivate investment. At a point when the expansion in advertised estimation of the extra unit surpasses (or is not as much as) the substitution outlays, businesses will need to build (diminish) their current capital stock (Serven & Solimano, 1992). According to this version, it could be contended that there may be an advantageous connection between asset prices and investment. However, this model disregards the constrained investment effect of collection inflows.

### **2.2.6 Disequilibrium model**

This model regards investment as a component of company or enterprise benefit and requires yields. In this version, investment choices occur at two levels. To start with, there is the choice to grow the level of beneficial limit. This choice relies on the expected degree of capacity utilisation in the economy and in this manner supplies a sign of interest conditions. Second, there is the choice about capital intensity of the additional capital, which relies on the relative costs of those variables of creations like capital and jobs (Serven & Solimano, 1992).

It can be seen from the above that diverse models emphasis different drivers of investment.

## **2.3 Determinants of Private Investment**

The study chose the neoclassical investment model to assess the private investment capacities for the South African economic system. As per Du Toit and Moolman (2004), the neoclassical model is the most appropriate one of the six funding methods analysed above because it is balanced with a supply-side model for the SA economic system. This supply-side model consolidates the cost-limiting plus benefit augmenting basic leadership forms by private firms, where supply-side variables, for example, charges, loan fees and financing in the wider sense assume a huge part.

In accordance with this approach, diverse determinants of investment were distinguished (Jongwanich & Kohpaiboon, 2008), together with the following:

**Output gap:** The contrast between the actual and potential output is a valuable marker of interest settings in the product showcase and may pervasively affect private investment. Once actual output approaches potential output, it could indicate to the market an expanding demand and urge organisations to extend their ability to capture the growing interest. When a nation has excess capacity as evidenced by the wider gap between actual and potential output, organisations are probably going to defer their speculative investments (Jongwanich & Kohpaiboon, 2008) to the point when the economy improves.

**Interest rate:** There is uncertainty regarding the connection between financing cost and private investment. The hypothesis of loan fee focuses on the presence of a converse connection between financing costs and funding. Supporting this hypothesis, Claeys, Moreno, and Surinach (2012) established that escalating security incomes makes it difficult for the private sector to look for backing in the capital markets. Earlier investigations by Misati and Nyamongo (2011), Ahmed and Islam (2004), Slam Logan (1998), Cardoso (1993), Greene and Villanueva (1991) and Broil (1980) also discovered comparative confirmation of the converse connection between genuine loan fee and funding. These discoveries are predictable with the Keynesian and neoclassical methods, where the loan fee is part of the cost of capital (Agrawal, 2004). Limited cash had been discovered to decrease productivity, thus prompting diminished capacity to self-fund speculations through higher debt servicing costs. The 'crowding out' impacts of the shortfall in financed public costs observed in less coordinated economies with much less incorporated money related market places (Claeys et al., 2012; Ghura & Goodwin, 2000) also supports these financial findings.

In spite of the above, Schnabel (2010) observed that rising financing costs actuate business visionaries to start exceptionally productive new companies sooner, while less gainful endeavours are delayed or even rejected. Therefore, because of the proximity of usage timing alternatives, investments that reflect timing choices are for the most part less (more) premium sensitive than other investment choices, where timing choices are absent (Schnabel, 2010). Supporting Schnabel's findings, an investigation by Agrawal (2004) uncovered that expanding real interest rate was related to expanding interest in four East Asian nations; however, this was only the case up to a particular level, past which the association turned

negative. As per Krishnamurthy and Vissing-Jorgensen (2011), credit chance as opposed to level of financing cost was basic to obligation supported funding.

**Public investment:** Public investment can both ‘crowd in’ or ‘crowd out’ private investments, contingent upon the backdrop on public investment (Jongwanich & Kohpaiboon, 2008). Public investment in main infrastructure was observed to crowd in private investment via a multiplier impact (Fedderke, Perkins, & Luiz, 2006). Then again, with constrained physical and budgetary assets (money related suppression), an expansion in the public investment can 'crowd out' private investment, in this manner initiating a negative relationship (Jongwanich & Kohpaiboon, 2008). Studies in various nations along these lines created blended consequences of lack of bias, crowding in or crowding out (Saeed, Hyder, Ali, & Ahmad, 2006).

**Real exchange rate:** The effect of the real exchange rate on private investment can either be to advance or hinder private investment. Real money deterioration reduces earnings and in this way reduces total demand. Cash deterioration could likewise increase the cost of imported capital products, prompting lower private investment (Jongwanich & Kohpaiboon, 2008).

**Uncertainty:** As acknowledged by the cutting edge hypothesis of investment, the investment choice is influenced by a prospect that is obscure and in this manner unverifiable. Investments speak to sunk expenses since capital – once introduced – can't be utilised as a part of an alternate movement without acquiring generous expenses. In this manner, changes in vulnerability can significantly affect collective investment (Serven & Solimano, 1992). Utilising political flimsiness as a degree of uncertainty in SA, Fedderke and Luiz (2008) and Kumo (2006) observed uncertainty to be a huge contributing factor of the investment work, whereas Aizenman and Marion (1999) observed unpredictability to contrarily identify with private investment and emphatically identify with public investment. Correspondingly, Yoshikawa and Stewart (2001:235) credited the decreased Japanese investment of 1990s to growing uncertainty.

Uncertainty takes distinctive structures, for example, macroeconomic, political strategy, market or specialized uncertainty. In this way, uncertainty is getting to be noticeably vital in new investment theory in light of the irrevocable notion of investment and timing alternatives

that prompt postponement of investments until the point that fresh data about the prospect winds up noticeably accessible (Wong, 2010; Anyanwu, 2006).

**Savings rate:** An expanded saving rate builds accessibility of investible assets which therefore grows the degree of interest in the economy (Odhiambo, 2005). Utilising South African information of the years 1950 to 2005, Odhiambo (2009) established that reserve funds as well as financial development Granger cause each other just in the short run, whereas over the lengthy haul, monetary development is the driving force of investment funds. As a ratio of GDP, SA's gross reserve funds dropped amid the 1990s (Perkins, Fedderke, and Luiz, 2005), plus have not recuperated in 2017.

While trying to address the above constraints, Jongwanich and Kohpaiboon (2008) and Acosta and Loza (2005) utilised particular nations, to be specific Thailand and Argentina, to assess the determinants of private investments. Be that as it may, even these investigations yielded distinctive flexibilities of the determinants of private investments.

## **2.4 Aggregate Investment in South Africa**

Aggregate investment consists of public investment and private investment (Kumo, 2006). The two combined empowers an unmistakable appraisal of the commitment or the extent of every part towards aggregate investment. Information from the SA Reserve Bank showed that private investment's commitment towards investment weakened to sixty three percent of the aggregate investment (SA Reserve Bank, 2013). Despite the fact that the extent of private investment had additionally been unpredictable, the extent of public investment in respect of aggregate investment was decreasing since around the nineteen seventies. It is just amid the period of nineteen sixties and as of late amid the era post the 2008 worldwide retreat which the extent of private investment has deteriorated. While government has announced plans to increase public investment, it remains to be seen whether this will actually happen at any significant level and then based on improved certainty, whether the current declining trend of private investment can be reversed.

To better understand the above historical trends, it is important to reflect on the history of South Africa's monetary and fiscal policies. Period around Nineteen Sixties was described by quantitative controls on interest costs and credit score. These controls restricted part of loan fees as a restorative money related apparatus (Aron & Muellbauer, 2002b). Since the

principle tool of credit control was immediate breaking points on the keeping money framework, this era was additionally connected to extensive level of monetary disintermediation (Aron & Muellbauer, 2002a).

The overwhelming influence by administration smothered financial movement and entrepreneurialism (Games, 2012:1), and constrained the development of private investment. This proceeded with decrease in private investment into the early period of the 1970s was additionally exacerbated by reasons as of now referred to (Weinstein et al., 1991).

The year 1985 merits unique specify as it constituted a watershed crossroads ever, also termed the time of 'debt standstill', activated by Citibank's rejection to move over SA's transient obligation. Notwithstanding its low global obligation level, South Africa reacted with a strict monetary teach that prompted additionally immerse decreases out in the public investment (Hentz, 2000). These occasions influenced the level of public resources growth, which dropped drastically amid this era (Bayraktar & Fofack, 2007). The proceeded with decrease in public investment was additionally because of the privatization program of government that released legislature of any substitution and support interests in the stripped resources. Privatization is seen as the exchange of government resources for the private division (Narsiah, 2002). It is amid this era that the Iron and Steel Partnership (Iskor, now Arcelor Mittal SA) and National Sorghum were sold (Hentz, 2000).

Private investment bounced back later in the Seventies in light of growing costs of items (Fedderke & Luiz, 2008; Kumo, 2006; Rodrik, 1991) as well as the previously mentioned privatization endeavours. Accordingly, it is contended that growing private investment amid this era to a great extent identified with the buy of state resources through the administration's divestment program. The Growth Employment and Redistribution (GEAR) of 1996 estimation of the African National Congress led administration gave arrangement progression to the privatization program of the earlier administration (Narsiah, 2002). The extricating of direct influence by administration, following the De Kock Commission (de Kock, 1985) additionally added to an increasing stage of private investment (Hentz, 2000).

On this manner, SA experienced twice wilful monetary solidification that affected on both public and private investment: firstly, from halfway to late 1980s (Hentz, 2000) in light of civil and financial confinement, secondly, via GEAR 10 years after the fact. The last even

ended up being termed the 'home-grown structural adjustment programme', like the cost lowering approaches below the Structural Adjustment Programme of the Bretton Woods Institutions that have been generally in charge of the decreasing public investment somewhere else in emerging nations. Despite the fact that the 2 changes happened over various political eras in South Africa, they both had two things in like manner, in particular financial sombreness and privatization (Narsiah, 2002). Subsequently, an enlarging hole amongst public and private investment as a ratio of the GDP developed and kept on augmenting (Bayraktar & Fofack, 2007).

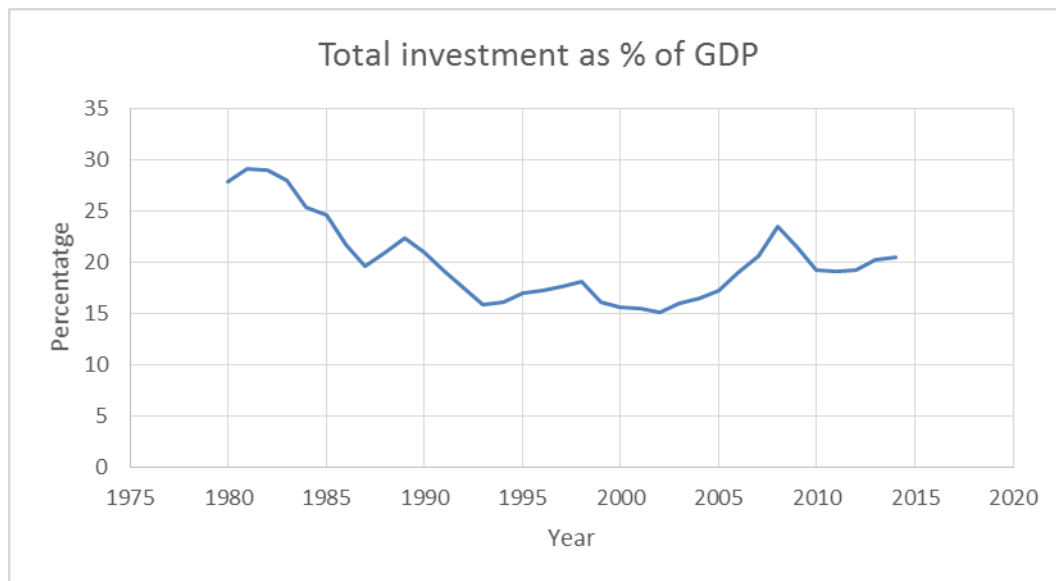
#### **2.4.1 Total investment as a percentage of the GDP**

SA's total investment as a ratio of GDP wavered around the reduced 12% midway to late Nineties to the present level of 20%. In spite of the fact that unsteady, total investment improved in the course of the Nineteen Sixties, still growing thru to the in the starting half of the Seventies, cresting at 20% in 1975. Overall investment is the place it was in 1975, after four eras. Earlier 1975 was excessive development time frame in SA, which gave additional confirmation that a nation at great investment levels is compensated with great monetary development fares (Guma, 2013). Albeit total investment is at present, where it was back in the mid-70s, current financial development rates are neglecting to recoup to the development rates that were accomplished amid that period. This means as an economy develops and changes, different components end up plainly imperative for supported monetary development. Thus, investment capacities contrast at each phase of the financial development cycle.

Since 1975, total investment began declining because of increasing political separation following the 1976 Soweto Uprising, weight from against politically-sanctioned racial segregation developments and the presentation and execution of the Sullivan Code. What took after was withdrawals by worldwide organisations (Weinstein, Alam, and Blose, 1991). A decrease in total investment proceeded until halfway through 1990s, because of the initiation of the novel law based allotment in SA Figure 2.2 gives a trend of total investment in SA since 1980.



**Figure 2.4 Total investment as a percentage of the GDP**



Source: South African Reserve Bank, October 2016

## 2.5 Empirical Studies

The investigational writing on the contributing factors of investment conduct is wide as well as generally partitioned into 2 gatherings: time series investigations for one or a few nations, and smaller scale econometric examinations utilising organisational level information. Amongst the previous, Loungani and Rush (1995), Blomstrom et al. (1996), Everhart and Sumlinski (2001), Campos and Nugent (2003), and Krishna et al. (2003) are the principle late referrals whilst organisational stage examinations incorporate, amongst others, Chirinko and Schaller (1995), Blossom et al. (2001), and Butzen et al. (2002). Despite the fact that the present inclination is toward miniaturized scale econometric examinations with board information at the firm level, this paper manages the main gathering procedure because of the absence of reliable micro data.

Acosta and Loza (2005) researched the determinants of private investment work in Argentina for 3 decades (1970-2000). Outcomes recommended that investment choices appear resolved, in the brief run, by stuns in yields (exchange rate, trade liberalization) and in total request. In addition, there's confirmation of "crowding out" impact of public investment. Over the lengthy haul, the resource gathering way appeared to be firmly subject to all-around created money related and credit markets and on points of view of financial maintainability.

Late experimental examinations for creating nations have discovered positive huge and strong impacts of increments in the investment ratio on financial development. Levine and Renelt (1992) established that the proportion to GDP of total investment is amongst a couple of factors which are heartily associated to development for a various gathering.

Ghura and Goodwin (2000) researched the contributing factors of private investment in Asia, Sub-Saharan Africa (SSA) and Latin America with board information for the era 1975 to 1992. They found private investment in emerging nations is fortified by real GDP development, increments in administration investment, upgrades in money related intermediation, and decreases in credit to the administration, plus decreases in world financing costs. Another fascinating outcome identifies with the role performed by academic improvement in fortifying private investment. Whilst real GDP development empowered private investment in Asia and Latin America, its impact was now not noteworthy in SA.

Matwanga (2007) found a progressive impact of funds, GDP development and public investment on the conduct of non-public financial specialists in Kenya. Additionally in Kenya, Kariuki (2003) contemplated the contributing factors of gross fixed capital arrangement then found that public investment decidedly influences private investment. The examination's discoveries demonstrated that output growth did not influence private investment, while money related approach assumed a less noteworthy part. Sakr (1993) established that commitment given to the private sector, public investment as well as GDP development significantly affected private investment.

Another imperative contributing factor of private investment is public segment investment, yet its immediate effect stays equivocal. To begin with, public investment might crowd out private investment, if the extra investment in public investment is funded using a shortage that prompts expansion in the interest rate, credit proportioning and taxation rate. The adverse connection amongst public investment and private investment was distinguished in the exact investigations of Taban and Kara (2006), Ghura and Goodwin (2000), Rossiter (2002); Cavallo and Daude (2011).

Secondly, public investment on communal and corporal framework (in the form of infrastructures, energy and communication) could help private investment by way of growing the non-public and communal level of profits through the arrangement of similar foundations.

Integral impacts amongst public and private investments were determined in the investigations of Green and Villanueva (1997), Blejar and Khan (1984), and Oshikoya (1994). The irregularity within the outcomes is probably a result of the endogeneity which could occur amongst private and public investment, which majority of investigations did not speak to. In any case, Mutenyo et al. (2010) didn't locate any noteworthy part performed by public investment with respect to private investment.

Jongwanich and Kohpaiboon (2008) analysed examples and determinants of private investment in Thailand amid the years 1960 to 2005, in light of the expanded adaptation of neoclassical investment hypothesis. They found that the accessibility of capital assets ought to be organized to guarantee that potential and prudential financial specialists can get to credit sufficiently. Over the long term, private investment is generally controlled by enterprise prospect and funding expenses. Administration may want to assume a part in advancing lengthy haul private investment for the most part through making a favourable investment atmosphere.

Shafik (1992) broke down private investment by considering certain highlights of a developing economy, for example, the oligopolistic structure of business sectors, putty-clay innovation, the inelastic supply of non-exchanged capital merchandise and budgetary suppression. Utilising Egypt as a contextual investigation, the outcomes demonstrated that at the macroeconomic level, private investment relies upon increase, inside financing, request and the cost of investment goods characterized not as the interest rate, but rather as the result of the association of free market activity in the market for capital products. The impacts of government strategy on private investment are blended, with some proof of crowding out happening in credit market places and of crowding in because of administration interest in framework.

Ibrahim (2000) dissected the contributing variables of lengthy-run total private zone investment conduct in Ghana. The outcomes demonstrated that there is some huge connection between private investment and the elements, for example, increase, the general cost level, aggregate call for and the price of funding over the long term. The outcomes additionally featured the way that adjustment strategies, went for controlling aggregate demand, for example, higher residential interest rates and exchange rate degrading, would hurt private investment in Ghana, in the event that they increment the cost of investment for private sector

firms. Second, financing vast monetary shortfalls through domestic borrowing, when all is said and done, diminishes the measure of assets accessible to the private investor, and furthermore raises the cost of borrowing for local firms and consequently harms private investment.

## **2.6 Conclusion**

The validation on the determinants of private investment, especially to develop African markets, is challenging. Given the difficulty of accessing information, reliance was therefore placed on multi-country cross-sectional relapse examination. The reasonable crucial constraint of multi-country cross-sectional investigation is that it depends on the verifiable supposition of 'homogeneity' in the surveyed association crosswise nations. It is an exceptionally prohibitive supposition on the grounds that there are extensive contrasts crosswise countries in connection to different auxiliary highlights and institutional angles, which have an immediate bearing on private investment conduct. Moreover, there are likewise immense contrasts between countries as for the nature and nature of information, which makes cross-country examination a fairly unsafe investigation.

This concern points to the need for undertaking in-depth time-profile analysis of private investment in individual country, by appropriately combining quantitative analysis with qualitative information on country-specific features in order to build a sound empirical foundation for informing the policy debate. Unfortunately, systematic country studies of this nature are few and far between. Therefore, this paper aims to examine patterns and determinants of private investment, using South Africa as a case study. A single equation of private investment determinant is estimated where a comprehensive set of explanatory variables are well defined and incorporated with a view to understand the yet fully recovery of private investment.

Private investors make investments with a goal of accomplishing a decent profit for their investment. In view of the irreversible idea of investment and the nearness of the planning alternatives, private investors consider a wide range of variables before settling on a venture choice. At hand are distinctive investment simulations which could be utilised to demonstrate the effect of various contributing variables of investment on one or the other aggregate investment or private investment. Diverse simulations are likewise in view of various suppositions prompting non-uniform outcomes or clarifications of investment conduct.

In spite of the above, the knowledge of the bearing of impact and extent of the effect of various determinants of investment will enable arrangement producers to settle on the correct strategy choices and detail fitting strategies that invigorate private investment. While the South African Government anticipates expanding public investment as an instrument to 'crowd in' private investment, understand that private investment can likewise be invigorated through various approach measures. Along these lines, there are different territories that ought to similarly get consideration regarding opposite and increment private investment in South Africa.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1. Introduction**

This chapter outlines the method chosen to answer the research questions and hypotheses identified in Chapter one. This chapter consists of the research design, population, the sampling method, data collection and data analysis.

#### **3.2. Research Design**

The study selected a quantitative, causal and descriptive research design in view of neoclassical hypothesis of interest in an effort to produce accurate representation (Saunders & Lewis, 2012) of determinants of private investment for the South African economic scenario. Both the dependent variable – private investment, – and the independent/informative variables were measured quantitatively. This research was conducted in the form of a longitudinal report including secondary time series data for all variables under attention.

#### **3.3. Data Analysis**

The investigation utilised the yearly private investment statistics (dependent variable) net of government investment spending and regressed against determinants of private investment.

The econometric analysis selected was for the period between 1980 and 2014. The period incorporates two very different periods in SA's political and economic history. Before 1994, SA was excluded from the world economies, whilst 1994 denoted the beginning of SA linking with world-wide markets again.

The method utilised in the assessment of the private investment capacities included the regression of the ratios of private investment to the GDP of all estimated illustrative variables, and applied the neoclassical version for the South African financial estimation. Describing  $X_t$  as the noticeable variables that affect private investment in SA in year  $t$ , the experimental relationship can be expressed as:

$$y_t = \alpha + \beta X_t + \varepsilon_t$$

Where  $y_i$  is the ratio of private investment to GDP,  $\alpha$  and  $\beta$  are parameters to be envisioned, and  $\varepsilon_i$  is a random error term with a mean of zero, representing measurement error and unquantified and unquantifiable elements that influence investment.

Lengthening equation 1 by unequivocally adding the applicable independent variables, it follows that:

$$PVT\_INV_t = \alpha + \beta_1 PUB\_INT_t + \beta_2 LI\_RATE_t + \beta_3 B\_SPREAD_t + \beta_4 SADUMM_t + \varepsilon_t \dots (1)$$

Where PVT\_INV is the ratio of private investment to the GDP; PUB\_INV is the ratio of public investment to the GDP; B\_SPREAD is the bond spread; LI\_RATE is the long-term interest rates; and SADUMM is the dummy variable introduced to measure the impact of SA's political and economic isolation.

The table below gives a breakdown of variables utilised as a part of the examination.

**Table 3: List of variables for multiple regression**

PVT_INV	Private investment as a ratio of GDP
PUB_INV	Public investment as a ratio of GDP
B_SPREAD	Bond spread
LI_RATE	Long-term interest rates
SADUMM	Dummy variable capturing the effect of years of SA's political and economic isolation (1980-1992)

Although alternative variables were obvious, bond spread was presented as the intermediary for macroeconomic uncertainty.

The findings from assessment of the information made it difficult to be generalised for the all developing countries. The study included only South Africa, which is not reflective of the developing countries since South Africa is an exceptional nation with an unusual history and experiencing various phases of fiscal development. Distinctive intermediaries were utilised for certain autonomous variables and this could prompt varying outcomes to the hypothesis.

### **3.4 Model Estimation**

#### **3.4.1 Unit root testing**

Most financial time series variables are non-constant, requiring the check for the imminence of unit roots utilising the Augmented Dickey-Fuller test (Awe, 2012). Taking into consideration that the information is regularly circulated without any rates of multicollinearity between regressors, a Unit Root Test for stationarity was lined up to individual variables to guarantee that the regression equation was evaluated on stationary data. Conducting a regression with non-stationary data yields flawed, worthless or false outcomes (Seddighi et al., 2000:246). Therefore, it became vital, while breaking down economic time series data, to conduct initial tests for non-stationarity prior to continuing with valuation. Economists are aware that differencing yields stationary data (Seddighi et al., 2000:246).

#### **3.4.2 Co-integration analysis**

Keeping in mind the end goal to investigate the long-run relationships and short-run dynamic collaborations among the variables of interest (private investment, public investment, long-term interest rate and bond spread), the ARDL co-integration method as a general vector aggressive (VAR) model, comprising the four variables, was applied. The ARDL co-integration method was developed by Pesaran and Shin (1999) and Pesaran et al. (2001). It has three benefits in relation to different past also customary co-integration strategies. The primary benefit is that the ARDL does not require every one of the variables under investigation to be integrated of the same order and may be connected once the fundamental variables are coordinated of order 1, order 0 or partially incorporated. The second benefit is that the ARDL check is moderately productive on account of limited sample data. The third and final benefit is that by making use of the ARDL estimation, one acquires reasonable evaluations of the long-run model (Harris & Sollis, 2003).

The Bounds test is based on the concept that the variables are  $I(0)$  or  $I(1)$ . Consequently, prior to making use of this test, one needs to decide the order of incorporation of all variables utilising unit root tests. The goal is to guarantee that the variables are not  $I(2)$  in order to maintain a strategic distance from spurious outcomes. Within the sight of variables incorporated of order 2, one cannot deduce the estimations of F statistics given by Pesaran et al. (2001).



The Bounds test is mostly considered in view of the combined F-statistic whose asymptotic appropriation is non-standard under the null hypothesis of no co-integration. Dual sets of critical values for a given significance level can be resolved (Pesaran et al., 2001). The initial degree is measured assuming that all variables involved in the ARDL model are incorporated of order 0, while the second one is measured on the basis that the variables are integrated of order 1. The null hypothesis of no co-integration is rejected when the value of the test statistic is larger than the upper critical bounds value, while it is not rejected, if the F-statistic is lower than the lower bounds value. If not, the co-integration test is baseless. The usage of this method was prescribed because of the use of limited data span.

### 3.4.3 Long-run short-run error correction model causality analysis

The symptom of co-integration suggests the existence of long-run equilibrium. This is rectified after the short-run disequilibrium from the error correction model (ECM), which is the suitable estimation of single equation. The error correction model evaluates the degree to which the equilibrium performance stimulates short-run dynamics. Equilibrium associations, in turn, have inferences for a short-run performance, where one or more series move to re-establish equilibrium.

The equations applied in this study are stated as follows-

#### Equation 2:

$$PVT_{INV_t} = \alpha_0 + \alpha_1 PUB_{INV_t} + \alpha_2 LI_{RATE_t} + \alpha_3 B_{SPREAD_t} + \alpha_4 SADUMM_t + \omega_t \dots \dots \dots 2$$

#### Equation 3:

$$PUB_{INV_t} = \gamma_0 + \gamma_1 PVT_{INV_t} + \gamma_2 LI_{RATE_t} + \gamma_3 B_{SPREAD_t} + \gamma_4 SADUMM_t + v_t \dots \dots \dots 3$$

#### Equation 4:

$$LI_{RATE_t} = \delta_0 + \delta_1 PVT_{INV_t} + \delta_2 PUB_{INV_t} + \delta_3 B_{SPREAD_t} + \delta_4 SADUMM_t + \xi_t \dots \dots \dots 4$$

#### Equation 5:

$$B_{SPREAD_t} = \rho_0 + \rho_1 PVT_{INV_t} + \rho_2 PUB_{INV_t} + \rho_3 LI_{RATE_t} + \rho_4 SADUMM_t + \eta_t \dots \dots \dots 5$$

Where PVT\_INV is the ratio of private investment to the GDP, PUB\_INV is the ratio of public investment to the GDP, B\_SPREAD is the bond spread, and LI\_RATE is the long-term interest rates.

Short- and long-run equilibrium between the variables under discussion were investigated with the help of ECM as given below:

$$d(PVT\_INV)_t = \alpha + d(\beta_1 PUB\_INT)_t + d(\beta_2 LI\_RATE)_t + d(\beta_3 B\_SPREAD)_t + d(\beta_4 U_{t-1}) + V$$

(5)

$d(PVT\_INV)$  = first difference of private investment to the GDP

$d(\beta_1 PUB\_INT)_t$  = first difference of public investment to the GDP

$d(\beta_2 LI\_RATE)_t$  = first difference of long-term interest rates

$d(\beta_3 B\_SPREAD)_t$  = first difference of bond spread

$U_{t-1}$  = One period lag of residual obtained from the OLS estimation

$\alpha$  and  $\beta$  are parameters to be estimated

$V$  = Error term.

### 3.4.4 Causality analysis

Once the co-integration association was confirmed from the Johansen and the ARDL bound test, the researcher used the Granger causality in a Johansen vector error correction framework. The presence of co-integration in the bi-variate relationship suggests lengthy-run Granger causality of at least one way, which under specific confinements can be tested through the Wald test (Masconi & Giannini, 1992; Dolado & Lutkephol, 1996).

### 3.5. Data and Sources

The data for this investigation were attained from the SA Reserve Bank and Statistics SA. In this manner, this examination utilised secondary time series data. All the data were yearly data, expressed in constant 2010 prices. The population reference was all emerging nations that expect to invigorate private investment. The source for all statistics was South African as the population was the emphasis of the study. The unit of analysis was private investment in SA by SA companies.

The statistics gathered for the examination included private investments as a ratio of the GDP, public investment as a ratio of the GDP, and long-term interest rates. All data were accessible to the public and can be retrieved from the websites of the SA Reserve Bank and Statistics SA.

## CHAPTER FOUR

### RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

#### 4.1 Introduction

As described in the preceding chapter, this chapter provides the discussion of the findings from the statistical analysis. It covers sections on descriptive statistics, unit root and co-integration analysis, long-run and short-run regression outcomes together with the findings from Granger causality analysis.

#### 4.2. Empirical Results

##### 4.2.1 Descriptive statistics

Table 4.1 provides the results of the descriptive statistics. Private investment averages 12.728% of GDP per year, while public investment averages 7.346% per year over the same time as demonstrated in Table 4.1 below. The widening range between public and private investment as a percentage of the GDP continues to increase (Bayraktar & Fofack, 2007). Although volatile in nature, bond spread averages 1.475%, while long-term interest rate is 12.518%.

**Table 4.1: Descriptive Statistics**

	<b>Private Investment % of GDP</b>	<b>Public Investment % of GDP</b>	<b>Bond Spread</b>	<b>Long-term Interest rates</b>	<b>Sadumm</b>
Mean	12.728	7.346	1.475	12.518	0.628
Median	12.477	6.757	1.726	13.508	1.000
Maximum	15.91	14.331	10.083	16.875	1.000
Minimum	10.564	3.959	-4.106	7.733	0.000
Std. Deviation	1.452	2.968	2.767	3.319	0.490
Skewness	0.729	0.913	0.77	-0.217	-0.532
Kurtosis	2.732	2.81	4.284	1.416	1.283
Jarque-Bera	3.206	4.919	5.869	3.936	5.950
Probability	0.201	0.085	0.053	0.14	0.051
N	35	35	35	35	35

#### 4.2.2 Unit root test

The findings of the ADF stationary tests indicates variables are non-stationary at level. The data at that point were changed via differencing. The variables all became stationary using first order differencing or remained integrated into order 1 (i.e. I (1). Subsequent to data change, the Unit Root Test was conducted to guarantee that the data were definitely stationary.

It is a fundamental criterion to observe the long-run relationship among the variables. Private investment as a ratio of GDP, public investments as a ratio of GDP, long-term interest rates and bond spread were all integrated into order one (I1). The results of the Augmented Dickey-Fuller test statistic are provided in Table 4.2 below.

**Table 4.2: Unit root tests using the Augmented Dickey-Fuller Test<sup>c</sup>**

Variables	Level				First Difference			
	ADF Test Statistic	Critical value at 5%	SIC lag	Prob	ADF Test Statistic	Critical value at 5%	SIC lag	Prob
Private investment (%)	-0.2489	-1.9510 <sup>b</sup>	0	0.589	-4.519	-1.9513 <sup>b</sup>	0	0.000
Public investment (%)	-1.196	-3.5485 <sup>a</sup>	0	0.895	-4.2656	-1.9513 <sup>b</sup>	0	0.001
Long-term Interest Rate	-0.4412	-1.9510 <sup>b</sup>	0	0.046	-5.6586	-1.9513 <sup>b</sup>	0	0.000
Bond Spread	-0.597	-1.9534 <sup>b</sup>	6	0.450	-4.7885	-1.9534 <sup>b</sup>	5	0.000

<sup>a</sup>Model with constant and trend

<sup>b</sup> Model without constant and trend

<sup>c</sup> The analysis method for the individual unit root test is carried out to the equation without constant and trend, equation without trend and equation, with constant and trend.

The researcher started with assessing the preceding equation, and if the trend was not significant, assessed the equation without trend. If the constant was not significant, one would assess the equation without constant and trend to test for the presence of a unit root. The test regression, which incorporates a constant and deterministic time trend, also takes into account the deterministic trend under the alternative. This method is suitable for trending time series such as macroeconomic variables.

### 4.2.3. ARDL bounds test for co-integration

All variables are I (1) as indicated by the ADF test that allows the researcher to conduct the co-integration test to determine the long-run relationship. Table 4.3 illustrates the calculated F-statistics when each variable is taken into consideration as a dependent variable. Their values are: for equation (1), PVT = 3.992; for equation (2), PUB = 11.819; for equation (3), Li RATE = 19.742; and for equation (4), B SPREAD = 37.351.

From those results, it is obvious that there may be a long-run relationship among all the variables because their F-statistic values are greater than the upper-bound critical value (3.67) at the 5% level. This means that the null hypothesis of no co-integration between the variables in all equations (1, 2, 3 and 4) is rejected.

**Table 4.3: Bounds Test for Co-integration Analysis**

	k = 4	F-statistic	CV 5%		CV 10%	
			I (0)	I (1)	I (0)	I (1)
			2.79	3.67	2.37	3.2
Equation 1		3.992***				
Equation 2		11.819***				
Equation 3		19.742***				
Equation 4		37.351***				

*Note: CV = Critical Value at 4 lags; K is the number of regressors;*

*\*\*\* Rejection of null hypothesis of no co-integration relationship at 5%*

### 4.2.4. Long-run estimates

The projected coefficients of the long-run relationship as indicated in Table 4.4 are all found to be significant at the 10% level when private investment is the dependent variable. The bond spread is negatively denoted and significant at the 10% level, suggesting the inverse relationship between private investments and bond spread. The coefficient of 0.209 suggests that a percentage increase in bond spread will bring about a 21% decline in private investment. This further indicates the negative impact of macroeconomic uncertainty on private investment. It demonstrates the discoveries of Wong (2010) and Anyanwu (2006) that uncertainty is a vital factor in any new hypothesis of investment in light of the irreversible

concept of investment and timing choices that prompt delay of investments until the point that new data about the future become public and accessible.

While earlier investigations about the effect of public investment on private investment in SA discovered confirmation of the 'crowding out' impact of public investment (Guma, 2013), the model results in a statistically significant positive coefficient of 0.131, which suggests that public investment 'crowds-in' private investment.

**Table 4.4: Results of estimated long-run coefficients**

	<b>Equation 1</b>	<b>Equation 2</b>	<b>Equation 3</b>	<b>Equation 4</b>
	<b>Coefficients</b>	<b>Coefficients</b>	<b>Coefficients</b>	<b>Coefficients</b>
Constant	0.086** (0.148)	0.101* (0.119)	-0.029* (0.201)	-0.050* (0.263)
PVT_INV		-0.251* (0.369)	-0.310* (0.625)	2.117** (0.815)
PUB_INV	0.131* (0.363)		0.226* (0.491)	-1.158* (0.639)
LI_RATE	0.405* (0.228)	0.322* (0.182)		0.376* (0.403)
B_SPREAD	-0.209* (0.124)	-0.131* (0.098)	0.016* (0.167)	
SADUMM	0.006* (1.545)	1.312* (1.232)	-1.253* (2.091)	1.137* (2.724)

*Note: Standard errors in parenthesis. ARDL (2,0,1,1,0) selected for equation (1); ARDL (4,0,4,0,4) for (2); ARDL (4,3,2,2,4) for (3) and ARDL (4,3,4,3,2) for (4) based on the Akaike Info Criterion (AIC).*

*\*\*\* Significance at 1%; \*\* Significance at 5%; \* Significance at 10%*

#### 4.2.5 Short-run estimates

Table 4.5 provides the outcomes of the short-run error correction terms. The Error Correction Model (ECM) is a non-spurious regression model as indicated by the R-squared and DW statistics. One period lag error correction term ( $U_{t-1}$ ) represents the equilibrium position in the long run. It directs the variables of the estimation to restore back to equilibrium or it rectifies disequilibrium. This happens when the sign is negative and significant. Error correction term indicates the level prior-time disequilibrium of the estimation is rectified, provided it is negative and significant. The variable  $U_{t-1}$  is negative and significant (in equations 1, 2, 3 and 4). The short-run disequilibrium is adjusted in the long-run equilibrium at the fastest rate of 185% by bond spread in equation 4, followed by public investment at 92% in equation 2. Equilibrium is restored in the private investment model (equation 1) at 58.2%.

Consistent with the long-run results, bond spread and private investment exhibit an inverse relationship in the short run (equation 3). Public investment is significantly positive at the 10% level (equations 1 and 3); these results demonstrate that public investment in core infrastructure is essential to draw in private investment. However, public investment has a significantly negative effect on the bond spread in equation 4; this further proves that uncertainty deters private investment as commonly reported in the media and those discoveries confirm the economic theory.

The short-run outcomes yield long-term interest rate results that are significantly positive at the 5% level across all equations. The review of literature had yielded uncertain outcomes with respect to the connection among private investment and long-term interest rates. However, the example on relationship in South Africa is consistent with the hypothesis of investment.

It emerges up from these results that private investment and bond spread are negatively correlated over the period between 1980 and 2014, and positively correlated with public investment and long-term interest rate for the same period when private investment is a dependent variable. The growth elasticity of bond spread during that time is 21%. It shows that the 1% exchange in bond spread will change private investment by 21%. From this finding, it can be inferred that macroeconomic uncertainty has had an adverse impact on



achieving high private investment. Private investment has an inverse relationship with long-term interest rate and bond spread.

**Table 4.5: Results of short-run error correction models**

	Equation 1	Equation 2	Equation 3	Equation 4
	Coefficients	Coefficients	Coefficients	Coefficients
D (PVT_INV)		-0.077* (0.249)	-0.238* (0.422)	0.420* (0.550)
D (PUB_INV)	0.003* (0.232)		0.334* (0.314)	-0.307* (0.409)
D (LI_RATE)	0.224* (0.171)	0.112* (0.136)		0.794** (0.301)
D (B_SPREAD)	-0.053* (0.081)	-0.067* (0.064)	0.035* (0.109)	
D (SADUMM)	-0.105* (1.008)	0.654* (0.803)	0.690* (1.363)	-0.050* (0.263)
$U_{t-1}$	-0.582*** (-3.968)	-0.921*** (-7.892)	0.321*** (13.126)	-1.851*** (-18.335)
F statistics	2.493***	4.872***	2.416***	7.335***
R-squared	0.686	0.801	0.649	0.865
Adj. R-squared	0.411	0.644	0.380	0.747
DW stat	2.156	2.147	1.689	2.165

*Note: T-ratios are in parentheses. DW = Durbin Watson statistics.*

*\*\*\* Significance at 1%; \*\* Significance at 5%; \* Significance at 10%*

## 4.2.6 Granger causality

The outcomes of the Granger Causality test conducted on private investment and its determinants appears in Table 4.6. The assessment was done to evaluate the causal bearing amongst private and public investment and affirm the nonappearance of some unidirectional Granger causality from private to public investment and from public to private investment (Pereira, 2001).

From the results, it is observed that private investment can Granger cause public investment. This suggests that increases in private sector investments have the capacity to put strain on

governments to invest extra in public infrastructure. This is the case when open infrastructure hinders private sector operations. Public investment in core infrastructure has been discovered to crowd-in private investment via multiplier impact (Fedderke, Perkins, & Luiz, 2006). Sakr (1993) discovered credit scores given to the private sector, public investment and GDP growth to significantly affect private investment. This further demonstrates the discoveries of reciprocal impacts amongst public and private investment, acknowledged in the experimental investigations of Green and Villanueva (1997), Blejar and Khan (1984) and Oshikoya (1994).

**Table 4.6: Granger causality test results**

Null Hypothesis	F-Statistic	Prob.	Test
<b>Lags: 4</b>			
PVT_INV does not Granger Cause B_Spread	2.395	0.081	***
PVT_INV does not Granger Cause LI_Rate	2.722	0.056	***
PVT_INV does not Granger PUB_INV	8.428	0.001	Reject
PVT_INV does not Granger SADUMM	0.608	0.661	***
B_Spread does not Granger Cause PVT_INV	1.946	0.138	***
LI_Rate does not Granger Cause PVT_INV	1.825	0.160	***
PUB_INV does not Granger Cause PVT_INV	0.718	0.589	***
SADUMM does not Granger Cause PVT_INV	0.312	0.867	***

*Note: \*\*\* = Fail to reject*

Granger causality test results prompt the realisation that private investment seems to cause public investment, as the p-value of 0.001 is less at the 5% significance level. Therefore, it can be deduced that the coefficients of private investment in the model with public investment as a dependent variable are not equal to zero. Thus, the prospect execution of public investment is influenced by private investment. Alternatively, it could be deduced that public investment does not Granger Cause private investment since the p-value of 0.589 is higher than the 5% significance level. This means that the coefficients of public investment in the model with private investment as a dependent variable are equal to zero and as such offer no clarification in anticipating the eventual fate of private investment.

#### 4.2.7 Model stability check/diagnosis

Both the Langrange Multiplier (LM) test and the DW test for all models show that the results are not affected by the serial correlation. It likewise passes all diagnostic tests heteroskedasticity (White heteroskedasticity test). The outcomes of these checks appear in Table 4.6. In addition, the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests were used to evaluate parameter stability (Pesaran & Pesaran, 1997). Appendix D plots the results for CUSUM and CUSUMSQ tests. The outcomes show the non-existence of critical bands of the 5% confidence interval of parameter stability.

**Table 4.7: Results of diagnostic test**

	Equation 1	Equation 2	Equation 3	Equation 4
Breusch–Godfrey serial correlation test	0.096 (0.317)	0.302 (0.569)	0.321 (0.565)	0.327 (0.592)
Heteroskedasticity test	0.985 (0.541)	0.998 (0.262)	0.999 (0.479)	1.000 (0.442)

*Note: P values are in parentheses*

## **CHAPTER FIVE**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter provides a summary of the study, the conclusion and the policy recommendations based on the discoveries from the empirical analysis.

#### **5.2 Conclusion and Summary of the Study**

This thesis reviews the causal relationship between private investment; interest rates and macroeconomic uncertainty in South Africa on yearly time series data range in the period between 1980 and 2014. This study was inspired by the consistent decrease in private investment in South Africa relative to total investment. There is a need to turn this pattern around. This study contributes towards a better understanding of the variables and their impact on the patterns of private investments, and the effects of interest rate and macroeconomic uncertainty on private investment in South Africa. The study employed an ARDL model for co-integration to research the presence of a long-run relationship between the variables and the Granger causality within VECM to check the interrelations among the series.

The findings revealed that the variables are non-constant at their level and become constant in their first difference. All equations are co-integration equations, demonstrating the long-run relationship between private investment, public investment, long-term interest rate and bond spread.

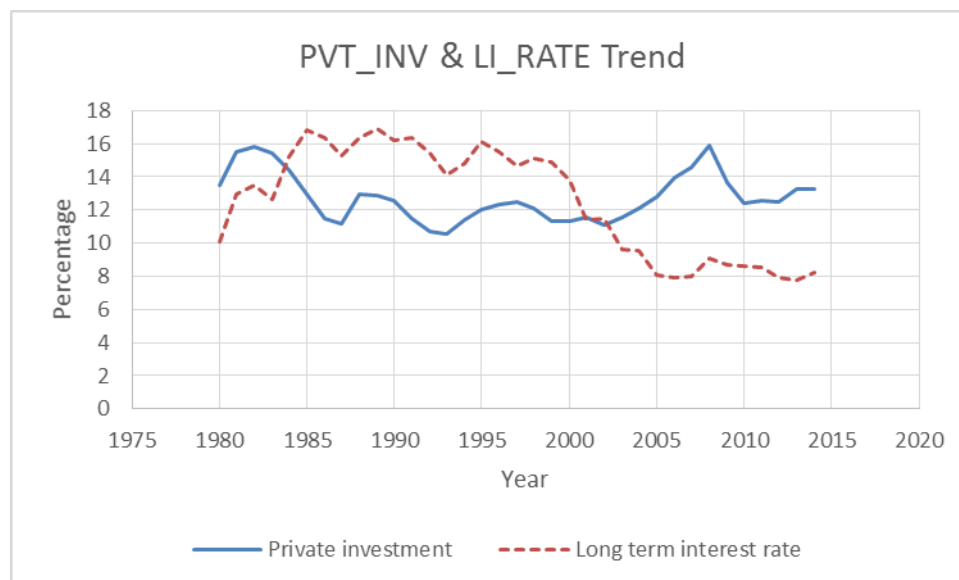
The results showed that macroeconomic uncertainty exerts an adverse influence on private investment that is in accordance with monetary hypothesis. In contrast to the theory, the long-term interest rates' coefficient is positive and significant in the projected equation. Therefore, the conclusion is that this substitute for interest rate contributes to the reduction of private investment. With a specific end goal to restore private investment, government ought to consider embracing strategies that lift aggregate demand, offer greater investment impetuses, ease credit requirements by moulding a more effective and strong budgetary framework, diminish macroeconomic uncertainties, encourage infrastructure development, and empower influx of foreign investment. Whilst unwinding credit requirements has been observed to be a

powerful instrument to help private investment, it should be remembered that credit development without satisfactory monetary policy-related supervision might be crisis prone. It might prompt an investment blast that will in the long run bust and result in more decimating impacts. The recent subprime contracts crisis experienced by the US serves as a striking indication of the significance of monetary policy-related supervision.

Distinguishing determinants for private investment is vital for the South African economy as much as for other nations. Against this setting, the pertinent information regarding South Africa's private investment and appropriate variables data since 1980 were collected and then investigated.

The assumption that interest rates significantly affect private investment was examined, with the 10-year government bond yield to suit the long-term nature of investment with long-term interest rates. The multiple regression equation projected previously, generated results that are significantly positive at the 95% confidence level. Based on this outcome, the null hypothesis that interest rates have no significant relationship with private investment is rejected.

**Figure 2.5 Private investment and long-term interest**



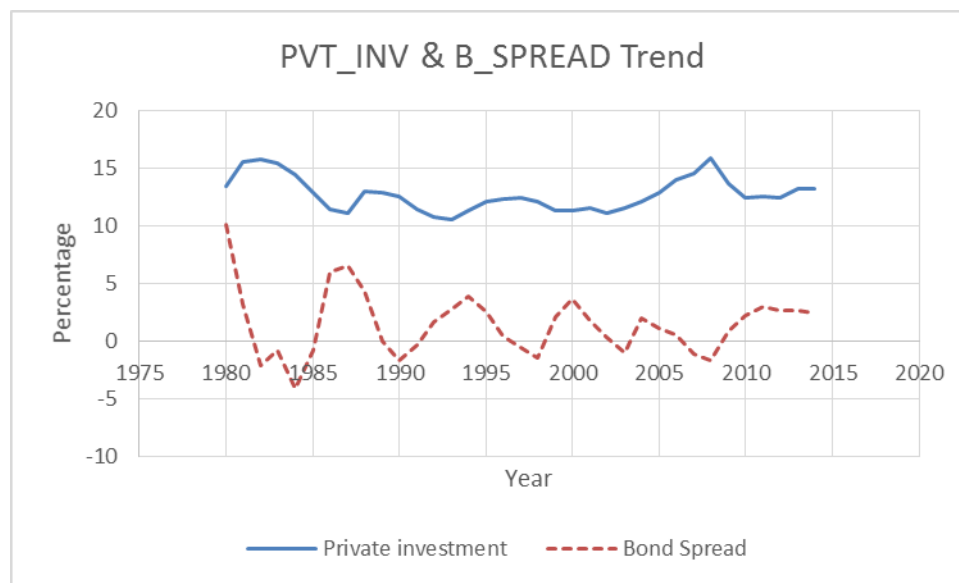
*Source: Author's design from research results*

Figure 2.5 indicates the adverse relationship between private investment and long-term interest rate. The time of excessive interest rates was likewise connected with a low and dormant private investment level, in this way affirming the above finding.

From the policy perspective, this infers that concessionary subsidising plans should be upheld and supported by government. For example, the Manufacturing Competitiveness Enhancement Programme (MCEP) of the Department of Trade and Industry (dti), among others, can possibly invigorate private investment within the South African economic system. These plans hypothetically could also address the scenario that in spite of the fact that the plans that give reasonably-priced funds are negligible in South Africa, over time and as these plans develop in measure, they can possibly limit the fiscal arrangement. Further, interest rates are at notable low levels, while private investment is declining as a level of the GDP or expanding at a diminishing rate. This demonstrates the restrictions of interest rate impact in invigorating private investment, if there is political or monetary uncertainty in the country.

The second hypothesis that macroeconomic uncertainty has a significant effect on private investment was examined, using the bond spread as a substitute for macroeconomic uncertainty. From the outcomes of the projected equation, it is clear that uncertainty matters in the SA economic system. The model yielded a statistically significant negative coefficient. For that reason, the null hypothesis as specified above fails to be rejected. The model therefore validates that uncertainty is undesirable for private investment and therefore confirms the outcomes of prior discoveries by Kumo (2006). Hence, elements in charge of uncertainty ought to be addressed urgently regarding creating an investor-friendly setting (Salahuddin & Islam, 2008).

**Figure 2.6 Private investment and bond spread trend**



*Source: Author's design from research results*

Figure 2.6 above validates the adverse relationship between private investment and uncertainty. Consequently, the nature of SA's economic systems affected private investment and further resourced inflows; for example, foreign direct investment and capital inflows. Such inflow resources necessitate financial traders' trust in the economic strength of the state (Frey & Volz, 2013).

### **5.3 Recommendations for Future Research**

It emerged from the empirical theory of the crowding-in reality by public investment that future studies might focus on what type of private investment is crowded-in via public investment or what type of public investment crowds-in private investment. This analysis was not possible to be conducted in this present study because of information challenges. Considering South Africa's excessively high level of unemployment and the recently created Jobs Fund, an investigation regarding the effect of public investment on private sector employment could likewise create critical as well as significant information regarding job creation in the private sector.

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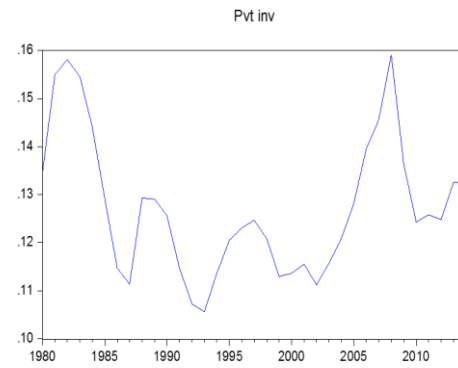
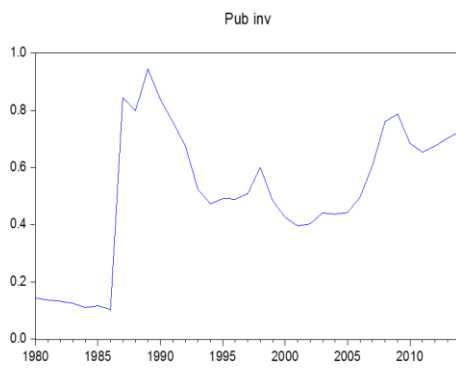
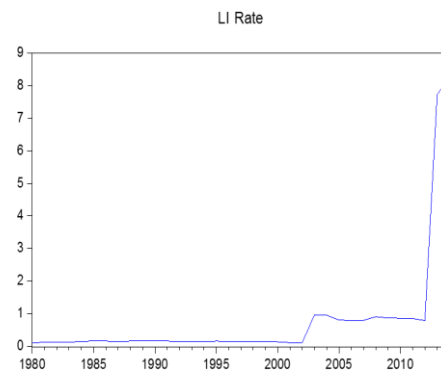
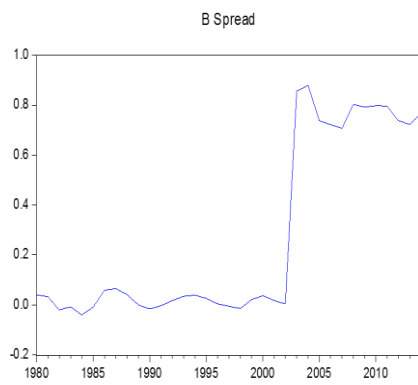
## APPENDICES

### Appendix A: Original data

	Pvt inv	Pub inv	B Spread	LI Rate	SADUMM
1980	13.46	14.33	10.08	10.08	0
1981	15.49	13.63	3.19	12.98	0
1982	15.81	13.18	-2.08	13.51	0
1983	15.46	12.47	-0.72	12.67	0
1984	14.41	10.95	-4.11	15.23	0
1985	12.92	11.67	-0.73	16.80	0
1986	11.47	10.25	5.95	16.38	0
1987	11.14	8.44	6.60	15.31	0
1988	12.93	7.99	4.36	16.37	0
1989	12.90	9.44	0.05	16.88	0
1990	12.56	8.38	-1.63	16.17	0
1991	11.47	7.59	-0.35	16.33	0
1992	10.73	6.76	1.73	15.46	0
1993	10.56	5.24	2.76	14.08	1
1994	11.37	4.73	3.88	14.83	1
1995	12.05	4.91	2.57	16.12	1
1996	12.31	4.89	0.45	15.48	1
1997	12.47	5.09	-0.55	14.69	1
1998	12.08	6.00	-1.45	15.13	1
1999	11.30	4.84	2.09	14.91	1
2000	11.36	4.25	3.68	13.78	1
2001	11.55	3.96	1.74	11.41	1
2002	11.12	4.03	0.32	11.51	1
2003	11.57	4.41	-1.00	9.63	1
2004	12.09	4.37	2.01	9.54	1
2005	12.82	4.43	1.16	8.07	1
2006	13.96	4.96	0.59	7.95	1
2007	14.56	6.08	-1.15	7.98	1
2008	15.91	7.60	-1.70	9.11	1
2009	13.64	7.87	0.89	8.71	1
2010	12.43	6.84	2.21	8.62	1
2011	12.58	6.54	3.03	8.52	1
2012	12.48	6.75	2.63	7.91	1
2013	13.26	7.02	2.65	7.73	1
2014	13.24	7.26	2.45	8.26	1



## Appendix B: Summary of constant test



## Appendix C: Augmented Dickey-Fuller test results

Null Hypothesis: D(PVT INV) has a unit root  
Exogenous: None  
Lag Length: 0 (Automatic - based on AIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.519038	0.0000
Test critical values: 1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(PUB INV) has a unit root  
Exogenous: None  
Lag Length: 0 (Automatic - based on AIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.265578	0.0001
Test critical values: 1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(B SPREAD) has a unit root  
Exogenous: None  
Lag Length: 5 (Automatic - based on AIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.788473	0.0000
Test critical values: 1% level	-2.650145	
5% level	-1.953381	
10% level	-1.609798	

\*MacKinnon (1996) one-sided p-values.

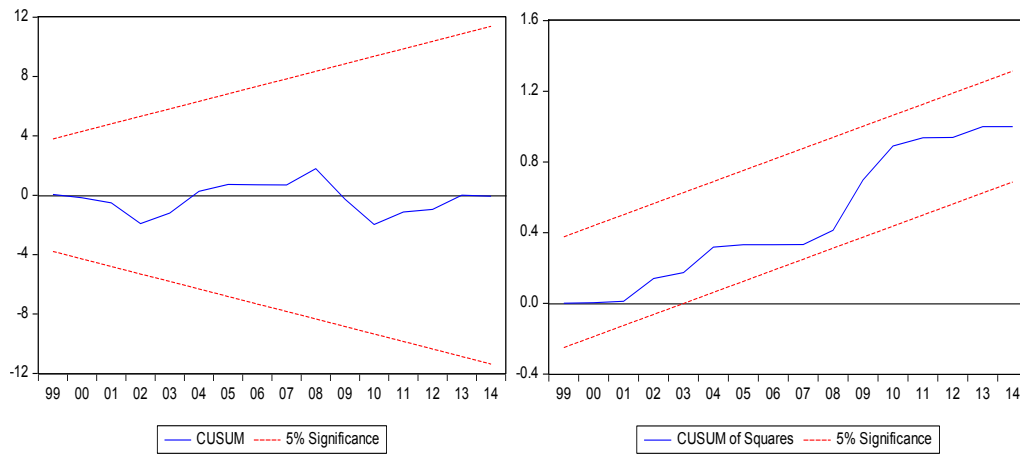
Null Hypothesis: D(LI RATE) has a unit root  
Exogenous: None  
Lag Length: 0 (Automatic - based on AIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.658639	0.0000
Test critical values: 1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

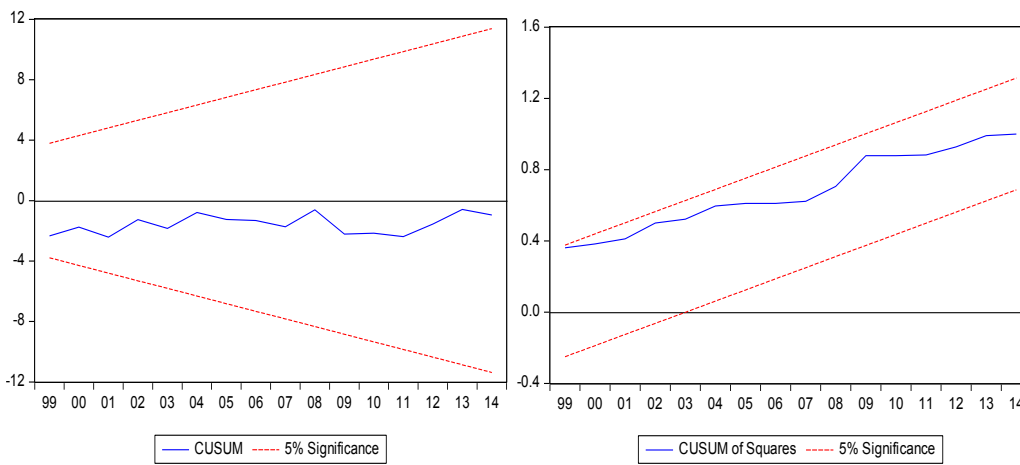
\*MacKinnon (1996) one-sided p-values.

## Appendix D: Plots of CUSUM and CUSUMSQ graphs

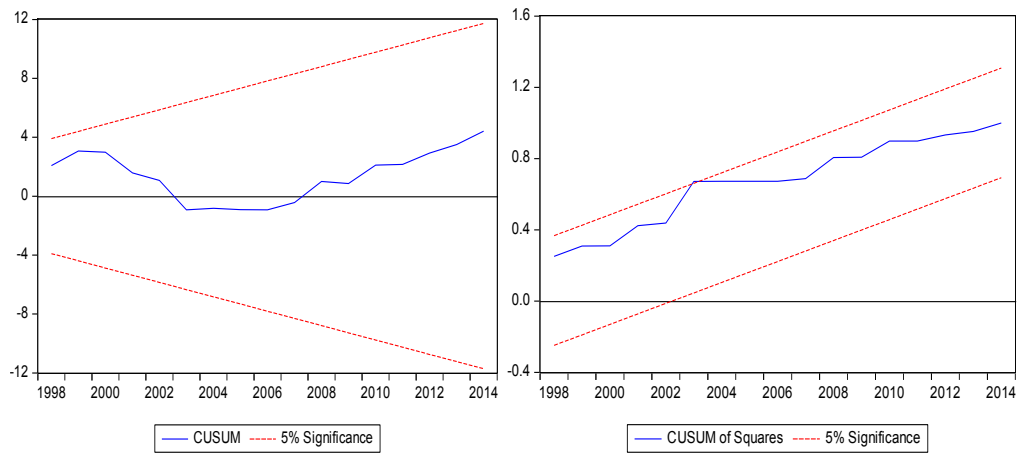
### Equation 1 - Private Investment



### Equation 2 - Public Investment



### Equation 3 - Long-term Interest Rate



### Equation 4 - Bond Spread

